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There are indications (Greenberg et. al., 1988), that fluffy (i.e. porous) particles are responsible for the observed 3.4 and 10 micron emissions of comet Halley. The absorption characteristics of small particles both solid and fluffy are needed in order to explain the Halley emissions. How isolated small solid particles react to an external radiation field is well known - the Rayleigh approximation. How these same small particles emit when assembled as fluffy aggregates is another question. To what degree are the emission spectra of isolated and aggregated particles comparable? In order to quantify the assertion that fluffy particles produce the observed Halley infrared emission features we are performing calculations to determine the effect of porosity on the absorption characteristics of aggregates of interstellar grain-type particles. Our calculations are based on an integral representation of the scattered electromagnetic field. We present results here, with application to comet Halley.

ref. :

Greenberg, J.M., Zhao, N. and Hage, J.I. : 1988, submitted to Nature